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January 22, 1955
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Piloted Jet Launched

See Page 57

A SCIENCE SERVICE PUBLICATION

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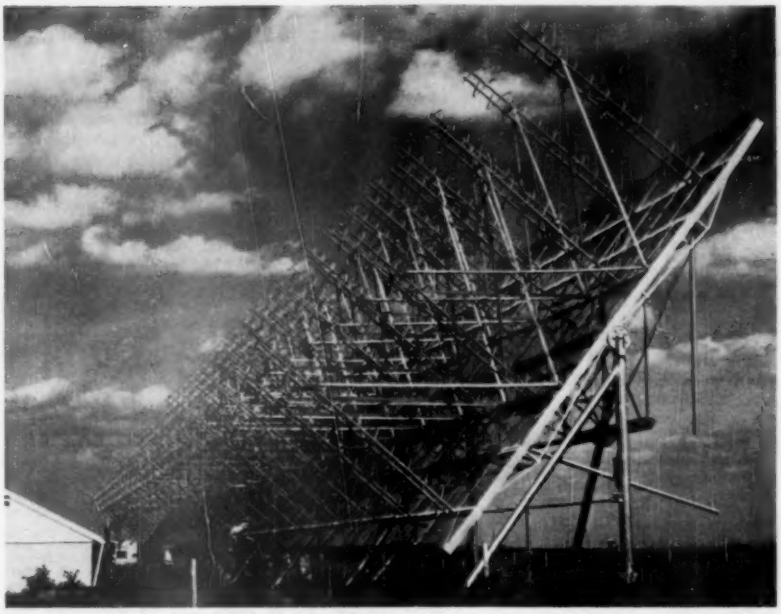
MAR 1



MESSAGES FROM SPACE—Ohio University's radio telescope was one of the four instruments to fix the center of our galaxy. The giant antenna picks up radio waves from space. With it astronomers can "see" some parts of the universe where light telescopes cannot penetrate.

RADIO ASTRONOMY

Pinpoint Galactic Center

Radio waves of various lengths broadcast by the nucleus of our Milky Way galaxy allow astronomers to locate its position more accurately than ever before.

➤ RADIO ASTRONOMERS have tuned in on radio waves being broadcast by the center of the giant pinwheel of stars that make up our Milky Way galaxy to pinpoint its position more accurately than heretofore possible.

Measurements made by scientists at the Naval Research Laboratory, at Ohio State University, and by Australian and Dutch astronomers have been combined to give the new precise location.

They used radio waves ranging from 56 inches to just over an inch in length (140 to 3 centimeters), compared to ordinary radio waves, which are about 1,000 feet long for the middle of the standard broadcast band.

The center of the Milky Way galaxy, it is concluded, is 8,500 parsecs from the sun, or 166,260,000,000,000,000 miles, at a right ascension of 17 hours, 42 minutes and 40 seconds and a declination of minus 28 degrees, 50 minutes and 55 seconds.

This confirms previous less exact positions that also put the galactic center in the constellation of Sagittarius, the archer, which becomes visible low in the southeast sky in May.

The distance figure is based on studies of radio waves 21 centimeters long being broadcast by the sparse hydrogen that fills the space between the stars. Dutch astronomers, led by Dr. Jan H. Oort of Leiden Observatory, the Netherlands, measured the shift in this radiation caused by motion of the gas.

The position is based on the variations in intensity of the different radio-wave frequencies at the center, and is a weighted average of the different measurements at four institutions.

The exact location of the nucleus of our galaxy has long been sought by optical astronomers, but it is hidden from view by vast clouds of interstellar dust. Radio waves, however, penetrate these dust clouds, even though light waves do not.

The sun, which is a star, and thousands of millions of other stars revolve around the galactic center, taking more than 200,000,000,000 years for one rotation.

Radio waves from the galactic center were studied by Naval Research Laboratory scientists, under the direction of Dr. John P. Hagen, at 3 and 9.4 centimeters as well as at 21 centimeters.

Drs. John D. Kraus and H. C. Ko of Ohio State University used radio waves of 140 centimeters for their determination of the center. The Australian scientists, led by Dr. J. L. Pawsey of the Commonwealth Scientific and Industrial Organization, used radio waves of 75 centimeters for their measurements.

Astronomers at Harvard College Observatory are also studying the radio radiation at the galaxy's center at 21 centimeters, using a 25-foot parabolic antenna. Dr. Bart J. Bok heads this project.

The discovery, made last year by the Naval Research Laboratory group, that there are one or more discrete sources of radio waves precisely in the direction of the galactic center showed that ionized hydrogen exists near or at the nucleus.

Astronomers are puzzled, however, as to why radio waves of 50 centimeters and less should be so strong from the center of the galaxy, since ionized hydrogen responsible for it is not usually thought to be heavily concentrated in the nuclear regions of galaxies.

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AERONAUTICS

1,000 Mile-an-Hour Planes Predicted

➤ PLANES THAT fly 1,000 miles an hour will be produced within the next few decades, it was predicted at a meeting of the Society of Automotive Engineers in Detroit.

At that speed a plane could circle the earth at the equator in one day.

Such planes should be completed long before 50 years elapse, Dr. Arthur L. Klein, professor of aeronautics at California Institute of Technology and consultant for Douglas Aircraft Company, Santa Monica, Calif., said.

He also predicted that the helicopter will come into its own within the next half century and that structural metals for aircraft will be at least twice as strong as the ones used today.

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ENTOMOLOGY

Museum Receives Gift Of 182,000 Insects

➤ THE LARGEST single collection of its kind, 182,000 moths, butterflies and other insects, has been acquired by the American Museum of Natural History in New York, Dr. Mont A. Cazier, chairman of the department of insects and spiders has announced.

A bequest of John Lowell Sperry, an amateur collector who died in January, 1954, the insect collection includes 165,000 moths from North America, Central and South America, Europe, India and Africa; about 16,000 butterfles and 1,100 miscellaneous insects.

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GENETICS

Radiation Can Harm Race

➤ IF AN atomic war raises the atomic radiation around us to even the amount considered the "maximum permissible," there would be about a third of a million infants born in the United States alone each year that would carry in their germ cells undesirable characteristics.

These affected genes would go on influencing heredity for generations to come. Persons defective physically or mentally may result.

This was the warning of Dr. A. H. Sturtevant, California Institute of Technology geneticist, who said he believed "it is inexcusable to state that no hazard exists" from increases in high-energy radiation to which human populations are being subjected.

Sources of increased radiation are explosions of A-bombs and H-bombs and the widespread use of medical X-rays. There are two types of hazards, those to the exposed individuals, and those that affect their descendants through genetic damage.

As for radiation increase due to fall-out at current levels, Dr. Sturtevant said, "it may be expected to give about one deleterious mutation per 100,000 germ cells per generation, or, since each individual arises from two germ cells, one per 50,000 conceptions." At present rates of radiation increase due to fall-out, this would lead to about 78 mutated germ cells a year in the United States and to about 1,800 a year for the world, Dr. Sturtevant said.

He sounded a sharp warning against any reckless use of medical X-rays. Radiation from this source, he said, appears to be a far more effective cause of mutation than is radioactive fall-out in much of the world.

"In the case of pregnancy examinations," he said, "it must be remembered that not only the mother's ovaries but also the germ cells of the child are being exposed. In the case of irradiation of the ovaries of a sterile woman to produce fertility it may be calculated that the resulting child has at least one chance in 50 of carrying a new mutation due to the treatment."

Speaking of the significance of his figures on genetic damage due to bomb fall-out, Dr. Sturtevant said:

"It may seem that this is a negligible proportion, and it should be emphasized that no individual should be particularly disturbed about the probability that his immediate descendants will be affected. But from a humanitarian point of view, any increase at all in the number of individuals that are defective either mentally or physically is not to be lightly dismissed."

The medical use and the fall-out danger Dr. Sturtevant considers different not only in the amounts of irradiation involved, but also in some ethical respects. An individual does not usually have to submit to X-ray examination or treatment and, when he does so, the irradiation is administered for his own personal advantage.

"But we are all of us submitted, willy-nilly, to fall-out," he said, "and while it may be argued that some of this is for our ultimate advantage, it must be recognized that we get fall-out from Russian bombs as well and that the rest of the world gets it from Russian and American bombs alike."

Science News Letter, January 22, 1955

NUTRITION

Diet Raises I.Q.

➤DISCOVERY OF a diet that will raise the I.Q. of mentally defective children suffering from the rare condition, phenylketonuria, was announced by Drs. L. I. Woolf, Ruth Griffiths and Alan Moncrieff of the Hospital for Sick Children, London, in the *British Medical Journal* (Jan. 8).

Three small children, two of them idiots and one an imbecile, have been fed this diet for four-and-a-half to ten months.

The mental ages of all three have increased at a marked rate, their I.Q.'s have risen and they may reach an intelligence level that will allow their going to school and being educated.

The previous lack of mental development in these children was due to a defect in the way their bodies handled the amino acid, phenylalanine. About four out of every 100,000 population are born with this defect.

Since phenylalanine poisoning caused the mental deficiency, Dr. Woolf decided to try devising a diet that would not contain this amino acid. Unfortunately, all dietary proteins are about equally rich in content of this particular amino acid.

Dr. Woolf solved the problem by using an acid hydrolysate of casein. This milk protein contains all necessary amino acids.

By treating it with charcoal, Dr. Woolf extracted the unwanted phenylalanine. This also removed tryptophan and tyrosine, which were put back into the mixture.

The material was fed as a soup cooked with starch and water. Since the patients were young and backward, the oldest being five years, with a mental age of eight months, soup feedings were particularly suitable for them.

As they progressed in mentality, a special kind of sugar cookie was allowed. They also got as much water and orange juice and sugar-water as they wanted, plus doses of vitamins and minerals.

For a child with a mental age of over two years, potatoes, carrots and cabbage were added to the diet, and the amino acid mixture was fed as a thick gravy flavored with tomato puree instead of as soup.

Backward, or mentally deficient, children who do not suffer from phenylalanine poisoning would not be helped by this diet. A simple test of the child's urine detects the unusual defect in body chemistry.

Some patients with epilepsy might also be helped, the studies suggested, since one of the three children stopped having attacks of epilepsy, which had also afflicted him.

"Petit mal epilepsy," the scientists said, "may also be due" to phenylalanine poisoning.

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ASTRONOMY

Moon's Face Was Pelted

Swarm of heavenly objects in a "sediment ring" blasted lunar surface during three stages of its melting, Dr. Gerard Kuiper of Yerkes Observatory proposes in new theory.

➤ THE "MAN" in the moon" resulted from impact of a swarm of heavenly objects on the lunar surface during three stages of the moon's melting, Dr. Gerard P. Kuiper of University of Chicago's Yerkes Observatory reported to the National Academy of Sciences in Washington.

Two types of theories have been proposed to account for the surface features of the moon. One is that the moon's craters were formed like most of those on earth, by volcanic action. The other is that meteorites smashing into the moon's surface caused the craters, as some are thought to have been formed on earth.

Dr. Kuiper observed the moon for nearly a year with the 82-inch telescope of the McDonald Observatory, Mt. Locke, Tex., operated jointly by the Universities of Chicago and Texas. He concluded that the impact theory is confirmed as the chief cause of lunar surface features. He used a binocular attachment that magnifies 900 times for his observations, thus getting better detail than even the best lunar photographs.

Dr. Kuiper said that the moon, as it sped away from the earth, plowed through a "sediment ring," a swarm of small satellites moving around the earth. The asteroid ring and the ring of Saturn are two such sediment rings now observable.

Originally, the earth and the moon were close together, a double planet with a very dense atmosphere. After the earth solidified and cooled, its oceans began to form.

Tidal friction produced on earth by the oceans sent the moon on its outward journey and into the sediment ring. As the larger bodies in the ring hit the moon, they formed craters. This occurred during the pre-melting period, when the moon's surface consisted of loose rubble.

Dr. Kuiper reported in the *Proceedings of the National Academy of Sciences* (Dec., 1954) that the moon and the earth are about 5,000,000,000 years old, a figure based on the analysis of meteorites. At that time, the heat production of radioactive uranium and potassium was about ten times greater than now, both for meteorites and the moon.

All spheres larger than about 60 miles in diameter would melt close to the center in about 1,000,000,000 years, Dr. Kuiper calculated. Much larger spheres would be entirely melted, except for a thin outer crust that remained solid.

During the stage of maximum melting, the maria, or seas, were formed. These are the dark areas on the lunar surface that make the face of the "man in the moon." They were caused, Dr. Kuiper believes, by impacts that broke the moon's crust and caused large exposures of lava, although not all at the time time.

The last stage in the moon's thermal history, Dr. Kuiper labels postmelting. It was during this period that the large ray craters and the thousands of small white craters were formed. These are best seen at full moon, while the premelting craters are nearly invisible at full moon.

While the moon was cooling, large quantities of steam escaped from its center and passed through the crust, "baking" it and leading to numerous fumaroles. When struck by objects in the sediment ring, this material became a substance resembling powdered glass, giving the white appearance.

It is possible, Dr. Kuiper suggested, to get direct information on the make-up of the lunar surface from an analysis of tektites, rounded, glassy bodies found on the earth's surface that some scientists believe are ejected from the lunar surface by the impact of meteorites.

In spite of the thousands of smaller bodies collected by the moon, the few large impacts contributed most of the mass added to the earth's satellite during the impact period. The total material swept up by the moon was about a five-thousandth of its mass, Dr. Kuiper calculated, which is "consistent with" the sediment ring theory.

The surface of the moon, Dr. Kuiper concluded, offers a "unique opportunity to study the composition of a sediment ring" shortly after its formation. He regarded it as a coincidence that the moon struck this ring near the time of its maximum melting.

Further studies, he said, could define where the sediment ring occurred and provide information about the moon's birthplace.

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AGRICULTURE

Clover Seed Supplies Short, Farmers Warned

➤ FARMERS HAVE been warned by the U. S. Department of Agriculture that they "must decide within the next few weeks how best to meet the problem of short supplies of red and alsike clover seed."

The seed supply of these two legumes is the smallest in years, the Department's agronomists reported. This year's supply amounts to only 80% of the 1943-52 ten-year average.

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COLOR TV—A color television camera, shown amid the operating lights, views surgery at Walter Reed Army Medical Center. The doctors can lecture or answer questions from students watching the operation on closed-circuit television receivers.

GENETICS

Heredity Units Made of Corkscrew Fibrils

➤ CHROMOSOMES, THE units in the cell that transmit parental characteristics to the offspring, are made up of tiny shreds, or fibrils, coiled like a corkscrew and about one twenty-five millionth of an inch thick, according to a theory presented to the American Association for the Advancement of Science meeting at Berkeley, Calif.

The theory was worked out from electron microscope findings by Prof. Hans Ris of the University of Wisconsin. It may provide the first step in answering an elementary but hitherto puzzling question about the structure of the chromosomes.

During cell division, chromosomes split lengthwise, each half going to a daughter cell and furnishing the master-pattern that the daughter cells follow in growing into a likeness of the parent. This method of cell division is the way old body cells are replaced by new young cells identical in structure and function to the old ones.

It is also the means by which sperm cells and ova are created, each containing the chromosomal master-pattern of a parent, which merge to produce an offspring with characteristics of both parents.

During the process of cell division the tiny fibrils making up the chromosomes apparently enlarge until they are twice as thick. Then they split lengthwise, giving rise to two new fibrils, Prof. Ris found.

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NUTRITION

Reducing?—Cut Proteins

➤ PERSONS WHO want to reduce weight can check their appetites by cutting down on the amount of protein foods, such as meat, fish, eggs and milk, they eat.

This will make them want less of other foods and so cut down on total calories consumed (see SNL, March 21, 1953, p. 179).

For successful reducing, however, fat people must follow a "ritual" of fixed conditions about the kind of foods, meal times, tempo of eating, exercise and even early rising in addition to cutting down on the calories.

Studies showing this were reported by Drs. Vincent P. Dole, Irving L. Schwartz, Jorn Hess Thaysen, Niels A. Thorn and Lawrence Silver of the Rockefeller Institute and Hospital, New York, in the *American Journal of Clinical Nutrition* (Nov.-Dec., 1954).

They put 42 very overweight men and women on a new kind of reducing diet in which only the protein was restricted. Patients could have all the butter, sugar, jelly and rock candy they wanted.

They also got unlimited amounts of fruit for dessert and of fruit juice. Portions of vegetables were generous. Those who liked cereal with cream for breakfast got it, though they were then limited to one slice of toast instead of three.

There was even cake for dessert. But the meat and fish were limited to servings measuring two by two by one-fourth inches, with two strips of bacon making a serving, and only one egg if eggs were substituted for meat at lunch or dinner.

Some of the very fat people put on this diet weighed more than two and a half times the average weight for their age and height. Many of the patients, 32 of the 42, lost about a quarter of a pound (100 grams) a day. They continued to feel well and tests showed their livers were not damaged.

Discouragingly, however, after the patients were discharged from the hospital most of them returned to their previous ways of eating. When seen three to 12 months later, 52% had regained all of their original weight, 30% had remained nearly steady and 18% had continued to reduce without supervision.

As a check to see whether the protein restriction actually had reduced appetites, the doctors during the test prescribed a high protein supplement for some of the patients. This led to an increase in the amount eaten from the unrestricted part of the diet, showing the protein restriction actually had reduced appetites.

Other factors entered into the weight loss while the patients were in the hospital.

For example, there was no raiding of ice boxes for a late evening snack, although the patients were allowed to save a slice of heavily buttered bread and jam from lunch to eat with fruit juice at bedtime. No alcohol was served, although most of the patients had been accustomed to taking it in moderate amounts. And the foods, although fully adequate according to diet tables, were not what the patients would have chosen for themselves.

Limiting protein in the diet therefore turns out to be a useful aid in reducing but, as with any other diet, medical supervision is necessary for the low protein diet.

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PUBLIC HEALTH

Smog-Fighting Methods

➤ METHODS TO remove smog-forming fumes from automobile exhausts and a three-pronged attack on industrial air pollution were proposed at a meeting of the American Association for the Advancement of Science in Berkeley, Calif.

The best way to remove carbon monoxide from auto fumes appears to be the use of nonleaded gasoline and a catalytic converter, Dr. W. L. Faith, chief engineer of the Southern California Air Pollution Foundation, said. Carbon monoxide, a very toxic gas, is the major component of auto exhausts, he said, and in Los Angeles alone 280 tons of it are spewed forth daily into the air by cars.

He pointed out, however, that manufacturers have considerably cut down the formation of the gas by improved auto designs.

Besides carbon monoxide, auto exhausts also contain hydrocarbons, nitrogen oxides, sufur dioxide, oil droplets and aldehydes.

Hydrocarbons, along with nitrogen oxides, are now believed to be a smog-forming source when present together in sunlight. The former, Dr. Faith said, could be removed by afterburners, catalytic converters, improvement in carburetion and improved fuels, while the nitrogen oxides might be deactivated by adding a chemical like iron oxide to the gas or exhaust.

At the same symposium on air pollution, Dr. Gordon P. Larson, director of Los Angeles County's Air Pollution Control District, proposed three courses of action to fight industry-caused smog:

1. Zoning factories.
2. Reducing pollutants at the source.
3. Dilution of toxic vapors at the source.

Allocating the use of land to prevent harmful concentrations from occurring at a single source can be an effective measure, he said. In applying this principle, mass rate of emission from an area is compared to the acreage utilized by the sources.

Reduction of smog-forming vapors at the source is accomplished, Dr. Larson said, by the installation of collection equipment, improving the design of basic equipment, or through operational changes which inhibit the discharge to the atmosphere. Possible methods are centrifugal collectors, electrical precipitators, cloth filters and wet collectors.

The third flank of attack, dilution at the source, is accomplished by using sufficient air to make the discharge unobjectionable. Tall stacks are one application of this principle.

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• RADIO

Saturday, Jan. 29, 1955, 5:00-5:15 p.m. EST.

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Charles D. Marple, medical director of the American Heart Association, and Dr. John W. Ferroe, Director of the Division of Community Service and Education of the American Heart Association, will discuss "Your Heart."

PUBLIC HEALTH

Study Smog Problem Using Breathless Humans

➤ SOME 30 human guinea pigs, picked because they are short of breath, will help solve the air pollution problem, Dr. John J. Phair of the University of Cincinnati College of Medicine, Cincinnati, Ohio, told a meeting of the American Association for the Advancement of Science in Berkeley, Calif.

Chronic heart and lung trouble cause the breathlessness. Such patients are unusually susceptible to air pollution because of their low respiratory reserve, as shown by similar patients during the killing smogs in London, Donora, Pa., and the Meuse Valley.

These 30 patients will be checked every week for three or four months to see how they have been feeling and to have their lung function measured. The checking period will be picked to include months when smog is likely to be greatest.

Environmental temperature and humidity and the general level of air pollution, as assessed by an automatic smoke recorder, will be measured continuously in the bedrooms of the patients.

At the end of this pilot study, Dr. Phair expects to know whether or not there is a specific association between measurable air pollution and measurable effects in the well being of people most likely to be affected by air pollution.

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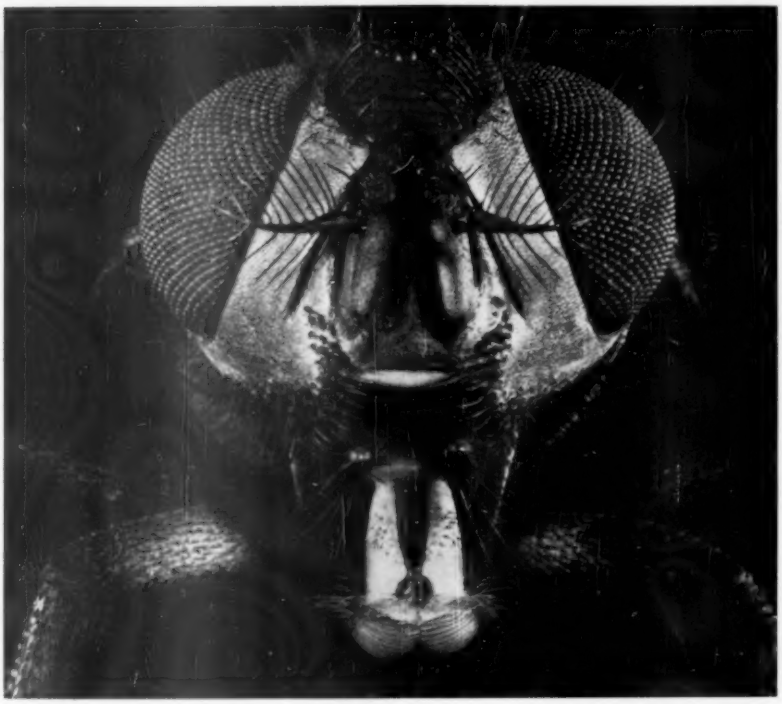
To perform work equal to that of a *mole*, a man, in size comparison, would have to dig a tunnel wide enough for him to crawl through and 37 miles long, in a single night.



STUDY IN SYMMETRY—This horny head is a model of the housefly. It is part of an exhibit of almost 100 photographs being shown at the American Museum of Natural History in New York. The pictures were selected from the 200,000 negatives in the museum's file that contains shots taken as far back as 1869. It is the first large showing by the museum's photographic division.

NUTRITION

Protein From Sharks

➤ THE FLESH of sharks and rays caught off the coasts of India have been found to be a high protein food source, foreseen as a vital and inexpensive weapon in the world's fight against protein malnutrition.

A finished product with an 85% protein content, or more than twice that of cheese and almost four times that of frozen raw beef, was obtained in laboratory experiments by G. B. Monhanty and A. B. Roy, of the Department of Fisheries, Orissa, India.

Reporting their find in *Science* (Jan. 7), the two scientists stated that this hydrolized fish protein produced from the flesh of waste fish contains all the principal amino acids in amounts that are fairly adequate for human consumption in comparison with other food products.

"It is very useful in treating cases of malnutrition, tuberculosis, and duodenal and ventricular ulcers and as a supplement to the diets of convalescent patients," they stated.

The general properties of hydrolyzed fish protein are that it is easily soluble in water, it keeps well in powder form, and it has a greater whipping power than egg albumen.

In addition, the Indian fishery experts reported, its properties are such that it could be used in the plastics, paint, leather and rayon-fiber industries.

Using the flesh from fish that has long been considered waste, and the lower cost of producing hydrolyzed protein from this source make production cheaper than many similar products made by other means.

"After testing the product on only a few patients," the scientists stated, "the demand has become very great. The investment for establishing a small plant would be moderate. And there is no doubt that the establishment of such a plant would certainly help millions of children and adults dying of malnutrition."

To derive the hydrolyzed fish protein from the flesh of a fish, the product is minced, washed, then boiled in dilute acid and washed repeatedly. The product is then dried and treated to eliminate the fat. Finally, the product is hydrolyzed. The yield is nearly ten percent.

Science News Letter, January 22, 1955

ENGINEERING

Auto Exhausts and Sun Held Cause of Smog

➤ AUTOMOBILE EXHAUST fumes plus sunlight equal smog, or at least one very noxious component of smog,. ozone. This was the theory advanced at a meeting of the Society of Automotive Engineers in Detroit.

Auto exhausts contain nitrogen dioxide and hydrocarbons, which in themselves are not very dangerous smog sources. But in the presence of sunlight they react to form ozone, a highly reactive, pungent gas, A. J. Haagen-Smit of the California Institute of Technology and Margaret M. Fox of the Los Angeles County Air Pollution Control District reported.

Tests show, they said, that eye-tearing smog, typified by that of Los Angeles, contains strong oxidizing agents, a substantial part of which is ozone. This form of oxygen gas contains three atoms to a molecule, instead of the usual two, and is a much more powerful oxidizing agent.

Their experiments indicate that a much greater amount of ozone is formed from an ideal mixture of nitrogen oxide and hydrocarbons than had been expected.

The scientists bottled exhaust gases from cars with motors running at different speeds, exposed the fumes to sunlight and tested for ozone. They found that an idling car produces a poor mixture for ozone formation, but that the combination of different exhausts poured into the air in stop-and-go driving is just ripe for the reaction.

As further proof of their contention that "automobile exhaust gases . . . are to be considered a definite source of smog," the scientists pointed out that the experimental concentrations of gases turned out to be very close to actual measured conditions in Los Angeles.

Science News Letter, January 22, 1955

BIOLOGY

Listen to Nature, Biologist Recommends

➤ IF YOU really want to enjoy nature, use your ears as well as your eyes, Dr. Loye Miller, professor emeritus of biology of the University of California at Los Angeles, has recommended.

"Listening has several advantages over sight," according to Dr. Miller. "Things do not catch your eye except as they come within a narrow visual angle. You can hear, however, through the whole 360 degrees of your horizon, through darkness, underbrush and walls."

You can learn many things by listening to insects, he said. For example, certain crickets give clues to the time of night and temperature changes. They chirp at a quicker, throbbing tempo in the warmer hours of early evening, but slow down very definitely as the temperature drops during the night.

Science News Letter, January 22, 1955

MEDICINE

Antiseptic Hand Cream Checks Germ Spread

➤ USE OF an antiseptic hand cream by nurses and doctors has proved effective in checking the spread of staphylococcus infections at Queen Charlotte's Maternity Hospital, London, Dr. John Murray, director of pathology, and Roy M. Calman, bacteriologist, at the hospital reported to the *British Medical Journal* (Jan. 8).

The cream is a soothing cream prepared to help protect against chapped hands as well as to kill staphylococcus germs that are common even on "socially clean" hands.

A new antiseptic, 1:6-di-4-chlorophenyldiguanidohexane 10,040, was incorporated in a cream called "hibitane." Other antiseptics might also be used if they can be put into a hand cream without losing their germ-destroying property, the scientists suggested.

"Hibitane" was used for 18 months without any case of allergy to it developing.

Science News Letter, January 22, 1955

PHYSICS

Nylon Balls Simulate Speed of 15,000 M.P.H.

➤ FLASHING BY at a speed equivalent to 15,000 miles an hour, some nylon balls are believed to have attained the highest Mach number ever reached under controlled conditions.

They get hotter than the surface of the sun. They light up the room in which they are fired.

The purpose of the experiment, conducted by the Naval Ordnance Laboratory's aeroballistics department, White Oak, Md., is to study what happens to the gases around a super-supersonic missile. Dr. Robert N. Schwartz and Jerry Eckerman found that the gases dissociate when projectiles reach Mach 10, or ten times the speed of sound.

This has a cooling effect on the surface of the missile, thus heat generated in flight does not increase as quickly when such great speeds are reached, they said.

The scientists believe their findings will produce basic information of great use to missile designers. At present, air speeds are limited by the "thermal barrier," the velocity at which projectiles begin to melt. At speeds of Mach 5 or over, all commonly used engineering metals become molten.

Nylon balls are used in the experiments because they are light and, although they are shot from a rifle with a 30 caliber cartridge, they reach speeds far greater than the largest artillery shell can attain. The balls are fired through a two-foot tube filled with xenon.

They have reached a speed of more than Mach 20, but the scientists achieved this by engaging in a little scientific "cheating."

The balls actually travel at about 7,150 miles an hour, which in air would be about Mach 10. But since they are shot through xenon, and this gas conducts sound a little less than half as fast as air, the balls technically are moving at more than Mach 20, or the equivalent of almost 15,000 miles an hour.

The scientists point out, however, that the balls simulate very closely what would happen if they were actually fired at Mach 20 in air.

Dr. Zaka Slawsky, chief of the hyperballistic division, said that he believed this was the first time that such high Mach numbers had been reached under controlled conditions.

Science News Letter, January 22, 1955

MARINE BIOLOGY

Traffic Problem Bothers Even the Lowly Shrimp

➤ THE ELIMINATION of traffic problems in Los Angeles is also contributing to the elimination of a long-established resident of that city, the fresh-water shrimp, *Syncaris pasadenae*.

Apparently, this small transparent shrimp, which was first discovered about 1895 in a small stream where the Rose Bowl now stands, can only live in small permanent streams where fish are scarce.

Now, however, the freeways of Los Angeles are replacing the necessary streams and the shrimp has not been seen in the area for nearly 20 years.

This note on the modern age was struck by Joel W. Hedgpeth, biologist at the University of California's Scripps Institution of Oceanography at the meeting of the American Association for the Advancement of Science in Berkeley, Calif.

Science News Letter, January 22, 1955

PSYCHOLOGY

Even in Kindergarten Boys Like Trucks

➤ EVEN AMONG five- and six-year-olds in kindergarten, little boys do prefer to play with trucks and trains or to play "grown-ups" with daddy's razor, and little girls would rather have dolls and dishes or doll up with mother's cold cream.

This was reported to the American Association for the Advancement of Science meeting in Berkeley, Calif., by Dr. Daniel G. Brown, clinical psychologist of the Parks Air Force Base Hospital, California.

Dr. Brown studied the preferences of 78 boys and 68 girls in a Denver public school in a middle class section of the city.

Some children, both boys and girls, Dr. Brown found, preferred the traditional toys of the opposite sex. However, little girls are more likely to want to play with boys' toys than boys are with girl playthings.

Some children seem to be mixed in their preferences. This tendency is about twice as frequent in girls as in boys, Dr. Brown found. In general, his findings tend to confirm the theories of Freud, Adler and others.

Science News Letter, January 22, 1955

IN SCIEN

PSYCHOLOGY

Recognize Tunes With Special Part of Brain

➤ WHEN YOU recognize a familiar tune like "Yankee Doodle" or "Auld Lang Syne," you need a different part of the brain from that required to distinguish middle C from F.

This was shown by experiments on animals reported at the American Association for the Advancement of Science meeting in Berkeley, Calif., by Drs. William B. Neff and Irving T. Diamond of the University of Chicago.

Cats were used as the experimental animals. They were trained to go in search of their dinner at the sound of a particular tune. Later the auditory centers of the cerebral cortex were removed.

Without that part of the brain, the cats could no longer recognize the dinner tune, but they could still learn to recognize a single tone when it was used as the "dinner bell."

Through such experiments with animals, it is hoped to learn more about what happens to a human when a part of the brain is lost through injury or disease.

Science News Letter, January 22, 1955

ASTRONOMY

Universe's Biggest Star 200,000 Times Sun's Size

➤ THE LARGEST star yet found in the far flung universe is 200,000 times the diameter of our sun, Dr. Armin J. Deutsch of Mt. Wilson and Palomar Observatories reported to the Astronomical Society of the Pacific meeting jointly with the American Association for the Advancement of Science in Berkeley, Calif.

This object is one of the show stars of astronomy, Alpha Herculis, visible to the naked eye, but so complex that telescopes, spectrometers and interferometers are needed to show its true nature.

Dr. Deutsch found that both the main star and double star companion are immersed in an immense cloud of intensely cold gas, making this aggregation a record for size.

The gas, which is close to absolute zero in temperature, is being ejected from the star system at such a rate that it loses a mass equal to that of our sun in 4,000,000 years, a very speedy loss the way time is measured in the universe.

This immense star aggregation is relatively close to us since Dr. W. P. Bidelman of Lick Observatory finds that it takes light 1,200 years to travel from it to earth.

Science News Letter, January 22, 1955

CE FIELDS

PSYCHOLOGY

Comic Book, TV Bans Not Delinquency Answer

➤ BANNING CERTAIN types of television programs or comic books is "an easy but superficial and hence fruitless answer" to the problem of juvenile delinquency, the *Journal of the American Medical Association* (Jan. 8) charged in an editorial.

Blaming parents is also easy but not a useful answer to the problem. Parents may be partly to blame but, in almost every case of juvenile delinquency, other factors over which parents have no control will be found to have played a part.

"If we want the delinquent to adjust to society we must recognize the importance of providing the sort of society to which a person may reasonably be expected to adjust," the editorial stated.

"The delinquent youth has been described as a rebel without a cause. He is essentially an unhappy person who is looking for a face-saving way to abandon his false bravado. He does not conform to the standards of a society from which he feels he has been excluded.

"Preventive measures should include more child guidance services in the schools, better mental hygiene instruction for parents, better training of teachers," and teamwork between psychiatrists, psychiatric social workers and other professional persons.

Science News Letter, January 22, 1955

PSYCHOLOGY

Some Drivers Just Get A Lot of Tickets

➤ THE HABITUAL traffic violator's only distinguishing feature is his unfortunate habit of breaking traffic rules and getting caught.

This was the conclusion of a group of University of California at Los Angeles scientists who interviewed 300 motorists with multiple violation records just prior to their hearings at a Los Angeles courthouse.

The average violator, as described to a meeting of the Highway Research Board in Washington, is between 21 and 25 years old, a skilled or semi-skilled worker, with average intelligence, respect for the law, a normal personality, and a good sense of humor.

The 300 cases interviewed racked up a total of 1,774 violations in a year, most of them of the moving type, including failure to heed traffic control devices, speeding and failure to yield right of way.

Only 12% of the 100 selected for detailed analysis indicated negative opinions or dissatisfaction with the legal standards, but 30% had unflattering things to say about the police and how they enforce the law.

When asked how they thought they could improve their driving status, 36.8% gave general solutions, such as "be more careful," while others had more specific comments, such as "watch traffic lights," "watch out for police," and "stop driving."

Eighty-six percent of the violators rated themselves as fairly good drivers. On the other hand, in response to the question, "what constitutes a good or bad driver?" the greatest number believed that a good driver obeys the law while a bad driver does not.

The scientists, Harry W. Case, Ismar Reiter, Ernst A. Feblowicz and Roger G. Stewart, of the university's Institute of Transportation and Traffic Engineering, suggested that since punishment does not seem to work on the habitual traffic violator, perhaps a training program would be the best way to correct him.

Science News Letter, January 22, 1955

MEDICINE

Pfizer Wins in Race For Antibiotic Patent

➤ A PATENT on the newest widely useful antibiotic drug, tetracycline, has been granted by the U. S. Government to Chas. Pfizer and Sons, Inc., Brooklyn, N. Y. This makes Pfizer the winner over four competitors, three of whom are now being sued by the Brooklyn firm for patent infringements.

The fourth competitor, Lederle Laboratories, Pearl River, N. Y., and Pfizer entered into an agreement in February, 1954, whereby whichever firm won the tetracycline patent would immediately license the other to manufacture the antibiotic.

Tetracycline, trade-named Tetracyn by Pfizer, is used to treat a wide range of ailments, including pneumonia, septic sore throat, scarlet fever, osteomyelitis, "running ears" and eye infections.

Science News Letter, January 22, 1955

TECHNOLOGY

Soft Wax Is Produced From Pineapple Waste

➤ FOLLOWING THE successful application of a hard wax derived from Spanish moss for polishing cars, woodwork and leather, scientists have now produced a soft wax from the pineapple.

In experiments conducted at the University of Florida, Seldon D. Feurt and Lauretta E. Fox of the college of pharmacy reported in *Science* (Jan. 7) that they derived a soft wax, which melts at 123.8 degrees Fahrenheit, from pineapple waste.

They also report that they have found hard waxes in other plants belonging to the same family as Spanish moss in an effort to catalogue what species would be best for cultivation as a wax source.

Science News Letter, January 22, 1955

AERONAUTICS

Thunderjets Launched From Truck Platform

See Front Cover

➤ CONVENTIONAL, PILOTED jet fighters have been launched from a truck platform in the world's first flights of such craft without a take-off run.

F-84G Thunderjets with booster bottles attached to their tails swooped up from the ramp and immediately took flight. The equipment that launches the Air Force's guided missile, the Matador, was used in the tests at Edwards Air Force Base, Calif.

A take-off is shown in the photograph on the cover of this week's SCIENCE NEWS LETTER.

The technique may eliminate the need for runways in certain combat conditions, and also add flexibility to maneuvers since the ramps are mobile.

Test pilot Bob Turner said the shock of the take-off was less than pilots experience during catapult take-offs. The planes were always under control.

The launching technique was developed by the Air Force's Air Research and Development Command and the Glenn L. Martin Co., Baltimore, Md.

Science News Letter, January 22, 1955

RADIO ASTRONOMY

Hydrogen Not Dense In Dark Spots in Space

➤ RADIO ASTRONOMERS have discovered that the very dense clusters of cosmic dust in the dark spots of the heavens, the possible pre-birth stage of stars, do not have extra-strong concentrations of neutral interstellar hydrogen.

The finding, important in understanding the evolution of stars, was reported by Dr. Bart J. Bok of Harvard College Observatory to the Astronomical Society of the Pacific meeting jointly with the American Association for the Advancement of Science in Berkeley, Calif.

No light waves are received from such dark spots in the sky, but radio waves from them do reach the earth. Using this radio radiation, the Harvard astronomers have charted the distribution of neutral hydrogen in two dark dust clouds.

Their work confirms that of Dutch radio astronomers that suggested the very densest dark spots in heavenly dark clouds do not have the increased radio radiation that should occur if cosmic dust and neutral atomic hydrogen were present everywhere in the same proportion.

The role that the hydrogen gas plays in stellar evolution is probably large, Dr. Bok said. The discovery that the extra-dark dust spots do not likewise have a very high hydrogen gas content must be taken into consideration by astronomers in their theories of the birth and evolution of stars.

Science News Letter, January 22, 1955

ASTRONOMY

Winter Constellations

Jupiter, high in the south, is brighest object in the sky except the moon. It appears in the constellation, Gemini, the twins, from which we get the expression, "By Jiminy."

By JAMES STOKLEY

➤ WITH THE coming of February, the winter evening skies shine in their full glory, made additionally brilliant in February with the presence of the bright planet Jupiter.

It is the brightest celestial object, except the moon, that is visible these evenings. Its position, high in the south, is shown on the accompanying maps, which depict the skies as they appear about 10:00 p.m., your own kind of standard time, at the first of February, an hour earlier in the middle, and two hours earlier at the end.

In the same part of the sky are shown the constellations that are characteristic of winter. Just below Jupiter, for example, are the two dogs. Procyon is the bright star in Canis Minor, the smaller dog, and below it is Canis Major, the larger dog, with Sirius, the dog-star.

Jupiter in Gemini

Jupiter itself is in Gemini, the twins, in which Pollux is the brightest star. To the northwest of this group is seen Auriga, the charioteer, with Capella, another star of the first magnitude.

Orion, one of the most familiar of all star groups, is seen above and to the right of Canis Major. It contains two first-magnitude stars: Betelgeuse and Rigel.

Between them are the three stars in a row that mark the belt of this legendary warrior. Still higher and farther right is Taurus, the bull, in which the brilliant ruddy star Aldebaran marks the eye.

Low in the west, in the constellation of Pisces, the fishes, is the planet Mars, which is still fading from its great brilliance of last summer. And in the east the star Regulus can be seen in the figure of Leo, the lion.

Saturn and Venus

Two more planets come up later in the night. Around 2:00 a.m., at the beginning of February, Saturn rises in Libra, the scales, and shines like a bright star.

It is followed a couple of hours later by Venus, in Sagittarius, the archer, blazing with such brilliance that there is no doubt of its identity. Indeed, it can be followed into the dawn, long after other planets and stars have disappeared.

Many common words and phrases come from sources that are generally forgotten, and some of these sources may be found in the skies.

People who use the mild expletive, "By Jiminy," probably rarely think that this has anything to do with the stars. But actually "Jiminy" is a slightly altered version of Gemini, the constellation of the twins, in which Jupiter now shines so brilliantly.

The names of these twins are Castor and Pollux. Castor is above and a little fainter. The twins were famous heroes in Roman mythology, and great temples were dedicated to their worship.

According to Homer, they were the sons of Leda and Tyndareus, who was king of Lacedaemon. Another legend says that Zeus himself was their father. Their sister was the beautiful Helen, over whom the Trojan War was fought.

Since Poseidon had given them power over wind and waves, they were particularly worshipped by the sailors. They were also favorite gods of the Roman soldiers, who thought they led them into battle.

When a soldier wanted to swear a particularly solemn oath, he would say, "by Gemini." This has survived to the present in our "by Jiminy."

"Arctic" Means Bear

Then there is the word "arctic," which comes from the Greek word for bear, a rather puzzling connection, for even though there are polar bears in the arctic regions, it is not likely that the Greeks knew about them.

However, the bear to which this refers is the constellation of the larger bear — Ursa Major, seen these evenings in the northeastern sky.

As this group swings around the north pole of the skies, at which the pole star, Polaris, stands, it is sometimes high, sometimes low; in the northeast, as now, or in the northwest, but always in the north. Consequently, the arctic regions are those toward the larger bear.

Still another word for north has the same origin. Look on the face of a dollar bill to the left of the portrait of George Washington. Directly under the words "One Dollar" is a blue circle, around which is inscribed: "Thesaur. Amer. Septent. Sigil." This is the abbreviation of Latin words meaning "Seal of the Treasury of North America," that is, of the U. S. Treasury.

Dipper Stars

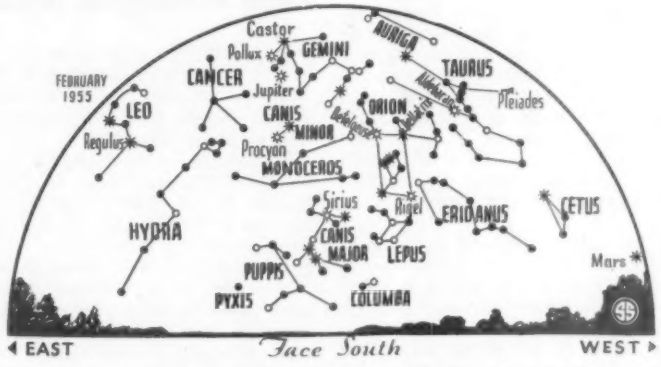
In the first syllable of the third word (Septent.) we recognize the Latin for the number seven. This refers to the seven stars that make up the Great Dipper, the most familiar part of the great bear. These were called, in Latin, "septentriones," so the Romans used "septentrio" to mean the northern regions.

But even though this figure has survived for so many centuries it will not do so forever. Although we sometimes call the stars fixed, to distinguish them from the planets that move about the sky, the stars also are in motion.

Most of them are so far away, however, that not for many centuries or even millennia will their motions become evident.

Two of the stars in the dipper, those at each end, are moving in one direction while the other five are going in another direction. It happens that they are now passing in such a way as to produce the figure we know.

Fifty thousand years ago the dipper had quite a different appearance, for the handle was nearly straight. Fifty thousand years in the future the handle will be much more kinked than now, and the bowl will be so twisted that it will not look like a dipper at all!



☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

Celestial Time Table for February

Feb.	EST	
2	2:00 p.m.	Moon nearest; distance 229,100 miles.
5	1:54 a.m.	Moon passes Jupiter.
6	8:43 p.m.	Full moon.
12	2:00 p.m.	Mercury between earth and sun.
14	8:58 a.m.	Moon passes Saturn.
	2:40 p.m.	Moon in last quarter.
	7:00 p.m.	Moon farthest; distance 251,200 miles.
18	3:58 p.m.	Moon passes Venus.
22	10:54 a.m.	New moon.
26	2:51 p.m.	Moon passes Mars.

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, January 22, 1955

GEOGRAPHY

Fabled Timbuktu Is Small, Squalid City

➤ IF YOU think of far-off Timbuktu as the ultimate in mystery and romance, you will be disappointed.

Timbuktu is not a picturesque seaport, nor an island, nor a country. It is, instead, a squalid little city of 6,000 persons located deep in the heart of French West Africa on the banks of the Niger River.

Dr. Benjamin Thomas, a geographer at the University of California at Los Angeles, has just returned from a visit to that fabled city of song and story.

Once, says Dr. Thomas, Timbuktu was called the "port of the Sudan in the Sahara" and a rich city of commerce which traded in salt, gold and slaves.

Today it has been by-passed by newer land routes, air transportation and easier access to the sea. "Timbuktu" is rightly used as a synonym of remoteness and isolation, the geographer adds, but not to denote romance or adventure.

Science News Letter, January 22, 1955

ANTHROPOLOGY

Mexican Indian Whistle Is a Language of Love

➤ WHEN A Kickapoo Indian youth living in Coahuila, Mexico, whistles at his girl friend, it is not an ordinary "wolf call."

The Kickapoo whistle is a regular part of courtship and conveys a definite message based on the pitch, accent and cadence of the Kickapoo language, Drs. Robert E. Ritzenthaler and Frederick A. Peterson of the Milwaukee Public Museum report in *American Anthropologist* (Dec.).

The young Kickapoo who wants to see his girl friend in the evening builds a campfire at one of several popular rendezvous spots near the village. He then cups his hands and blows into the cavity between the knuckles of the thumbs. The tone of the whistle is controlled by opening and closing the fingers of the left hand.

The girl friend recognizes his whistle just as she would be able to recognize his voice calling her. She steps out of her house and whistles a reply.

The whistled conversation may go something like this:

"Come on."

"Wait a minute."

"No."

"I'm coming."

At times just one couple will rendezvous, the scientists explain. But at other times a party of a dozen or more will get together at the same fire to talk, court, sing Mexican songs and, if liquor is available, drink. Sometimes, a little brother will tease by hanging around the fire until he has learned the whistling system of his older brother. The courting couple must be careful what they whistle to each other, because others in the village can "listen in."

Science News Letter, January 22, 1955

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ACTIONS OF RADIATIONS ON LIVING CELLS—D. E. Lea—*Cambridge University Press*, 2d ed., 416 p., illus., $6.00. Because this book has been out of print for some time, this new edition is made available without much change except for some additions and revisions, made by the author before his death, which are incorporated.

THE ADVANCEMENT OF SCIENCE: Vol. XI, No. 43—*British Association for the Advancement of Science*, 112 p., paper, *7s., 6d.* Including a brief report of the fall meeting of the British Association at Oxford, and some of the papers delivered there.

AUXINS AND PLANT GROWTH—A. Carl Leopold—*University of California Press*, 354 p., illus., $5.00. To provide agricultural research workers with a review of the physiological basis upon which applied technologies rest.

BASIC ELECTRICITY—Van Valkenburgh, Nooger and Neville, Inc.—*Rider*, 5 vols., illus., paper, $2.00 each volume or $9.00 for the set. A home-study course based on the instruction currently given at Navy specialty schools.

CELLULAR METABOLISM AND INFECTIONS—E. Racher, Ed.—*Academic*, 196 p., illus., $4.80. Papers presented at a symposium held at the New York Academy of Medicine, March 4 and 5, 1954.

COLOR CHANGE IN OIL PAINTINGS—Robert L. Feller—*Mellon Institute*, 6 p., illus., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Drawing attention to factors in color change that do not involve alteration of the pigments.

MAN AND THE VERTEBRATES—Alfred Sherwood Romer—*Penguin*, 437 p., illus., paper, 2 vols., 85 cents each. The director of the Museum of Comparative Zoology at Harvard gives a picture of the evolution of the human body.

MIRACLES OF MODERN SURGERY—Jean Eparvier—*Hastings House*, 166 p., illus., $3.00. A French journalist describes some operations, both rare and common, that he has witnessed, including the Blue Baby operation, appendicitis and hare lip.

MODERN ASPECTS OF ELECTROCHEMISTRY—J. O'M. Bockris, Ed. with the assistance of B. E. Conway—*Academic*, 344 p., illus., $6.80. Giving special attention to fields in which development has recently been considerable and to fields in which such advances are urgently needed.

THE NATURE OF THE UNIVERSE—Fred Hoyle—*New American Library*, 128 p., illus., paper, 35 cents. This book, based on broadcast lectures, presents the author's theories on the origin of the universe. Originally published by Harper.

PERSPECTIVES AND HORIZONS IN MICROBIOLOGY: A Symposium—Selman A. Waksman, Ed.—*Rutgers University Press*, 220 p., illus., $3.50. Contributions to a symposium held in connection with the dedication of the Institute of Microbiology at Rutgers. They deal with the many-sided aspects of a science devoted to microscopic forms of life and their relation to man.

PROGRESS IN STEREOCHEMISTRY: Volume I—W. Klyne, Ed.—*Academic*, 378 p., illus., $8.00. Discussing a few of the recent advances in this active field.

REPORTS OF THE BIOCHEMICAL RESEARCH FOUNDATION OF THE FRANKLIN INSTITUTE: Vol. XII 1952-1953 — Ellice McDonald, director—*Biochemical Research Foundation*, illus., free upon request direct to publisher, Newark, Del. Research papers by the director and members of the Foundation staff.

THE ROCKEFELLER FOUNDATION ANNUAL REPORT, 1953—Dean Rusk, President—*Rockefeller Foundation*, 482 p., illus., paper, free upon request to publisher, 49 West 49th St., New York City. Including a discussion of Congressional investigations, and some of the underlying principles which have been at issue.

SCIENCE AND MAN'S HOPE—James Street Fulton—*Bookman for Rice Institute*, 179 p., $3.25. "Science will not save us," writes the author, "but we can learn from it much that would help."

SCIENCE IN OUR LIVES—Ritchie Calder—*New American Library*, 192 p., paper, 35 cents. An English science writer tells of the methods of modern science and the relationship of science to other aspects of life.

SINGLE SIDEBAND FOR THE RADIO AMATEUR—Byron Goodman and others—*American Radio Relay League*, 176 p., illus., paper, $1.50. Selected and coordinated articles from past issues of QST telling the amateur how to apply this superior technique of radio telephony on his own set up.

TELEVISION FOR RADIOMEN—Edward M. Noll—*Macmillan*, rev. ed., 778 p., illus., $10.00. An advanced text for practical radiomen.

TRANSISTOR AUDIO AMPLIFIERS—Richard F. Shea—*Wiley*, 219 p., illus., $6.50. A book for the practical engineer on transistor applications.

Science News Letter, January 22, 1955

GEOLOGY

Meteorites on Earth Weigh 1,100,000 Pounds

➤ MORE THAN 1,100,000 pounds of meteoritic material from "out of this world" have been identified on earth, Dr. Frederick C. Leonard, professor of astronomy, and Bernard J. Finnegan, graduate student at the University of California at Los Angeles, have calculated.

This figure represents the total weight of all of the known meteoritic material on earth, which they compiled for the first time. It corresponds to a total of 1,495 recorded meteoritic falls.

Meteorites are classified in three general divisions. Siderites are composed almost entirely of nickel-iron. Aerolites, or stony meteorites, are made up mainly of silicate minerals. Siderolites consist of nickel-iron and silicate minerals in roughly equal proportions.

Most of the identified meteoritic weight on earth is in the 542 siderites, which have a combined weight of nearly 428 metric tons, a metric ton being 2,205 pounds.

The 895 aerolites weigh over 18 metric tons, and the 56 siderolites weigh more than 21 metric tons.

Science News Letter, January 22, 1955

ZOOLOGY

Longhorns Number 500

➤ THE SYMBOLIC animals of America's Western frontier days, Texas longhorn cattle, now number more than 500, it was announced by Secretary of the Interior Douglas McKay.

Close to extinction less than 25 years ago, the majority of longhorn cattle surviving from the herds that once numbered thousands are now maintained on national wildlife refuges under Federal protection. A few, the Department reported, are still in private ownership.

The largest herd in the country, 376 animals, is to be found at the Wichita Mountains Refuge, near Cache, Okla. Another herd of 146 is maintained at the Fort Niobrara National Wildlife Refuge near Valentine, Nebr. Four steers are located at the Malheur National Wildlife Refuge, Burns, Ore., and two bulls are on the National Bison Range, Moiese, Mont.

The longhorns were still numerous after the Civil War, the wildlife experts reported, but were soon forgotten as livestock breeders began raising heavier, beefier and more disease-resistant cattle. By 1920 it was difficult to find more than one or two of these animals on the western plains.

Conservation of these vanishing animals was made possible through the efforts of the late John Hatton of the U. S. Forest Service and the late Will C. Barnes, public official, author and one-time cowman, the Department said.

These two men traveled more than 5,000 miles and examined more than 30,000 head of Texas cattle in the late 1920's before gathering a herd of 30 survivors, which became the nucleus of the present Wichita herd.

The longhorn first landed in this country when the animals were brought to America in 1521 by Gregorio Vallalobos, a governor-general sent to "New Spain."

The animal is described as leggy, hardy and active, with long keen horns and an "aggressive disposition." It ranges in color from black, brindle, dun, spotted, buckskin, red, roan and white to combinations of these colors.

The longhorn is slow of growth, but as the animal matures, the horns keep growing. On record, the Department reported, are horns with spreads of up to eight feet from tip to tip.

"While the Texas longhorn cannot be classed as a game animal," the conservationists concluded, "its preservation is considered desirable because this type of cattle was so prominently identified with the early history of the West and the settlement of the country."

Science News Letter, January 22, 1955

AERONAUTICS

Tell Ways to Eject Pilots in One Piece

➤ WHEN YOU face a 300-mile-an-hour breeze, your eyelids are forced open and are raised like umbrellas. Above 400 miles an hour the air can force your mouth open and destroy the lungs by overinflating them. Above 500 miles an hour your face may be lacerated.

These are just a few of the problems faced by designers of equipment to bail out pilots from jet planes, described by William Bonas and M. J. Reilly, designers for the Glenn L. Martin Company, Baltimore, Md., at a meeting of the Society of Automotive Engineers in Detroit.

Another great problem is how to prevent the pilot from being cut to bits by the tail section of the plane when he is ejected. Even when he is wearing knee guards, a 500-mile-an-hour wind will fling the pilot's legs outward and tear them from the sockets.

Three fundamental solutions to the problems of getting the pilot out of a plane in one piece were described as:

1. The simplest, a "baby carriage capsule," encloses the pilot and the seat in a shell-like hood. The unit is ejected from the plane. It forms a water-tight pod that will float if it lands on water.

2. The pressurized cockpit, including canopy, seat, control stick, instrument panel and oxygen supply system, is separated from the rest of the plane by a catapult or rockets. The unit is stabilized by fins.

3. In "the ultimate in capsule design" the entire nose section of the ship is ejected by explosive bolts and rockets.

In all these designs the unit may tumble violently before the parachute opens. The added forces generated by tumbling might exceed human endurance, causing injury or even death.

Science News Letter, January 22, 1955

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ENTOMOLOGY

Radar Is Newest Weapon In Fight on Locusts

➤ TRACKING LOCUST swarms by radar is now seen as the newest means for providing data to carry on successful aerial warfare against these ravenous insects.

Held only as a theoretical possibility heretofore, the use of radar in supplying information on the structure, density and movements of flying swarms has now been confirmed, Dr. R. C. Rainey of the Desert Locust Survey Headquarters, Nairobi, Kenya, reported in *Nature* (Jan. 8).

The first radar-sighting of a locust swarm, the scientist said, was recorded on March 22, 1954, in the Persian Gulf by H.M.S. Wild Goose.

"The locusts appeared to constitute a swarm of at least 15 miles radius," he stated, "and were detected at ranges up to 60 miles over a sector of up to 80 degrees, giving large 'fluffy' echoes on a plan-position-indicator, similar to the effects of mechanical jamming."

Before this recording, radar monitors faced the problem of trying to distinguish between a heavy rainfall echo and that caused by the locusts. The use of newer radar sets has now made the distinction in echoes possible.

What it will mean in the locust warfare can be likened to that of human warfare. The data from the radar, similar to early warning systems for detecting aircraft, together with meteorological and other information, will permit airplanes to engage the flying swarms in mid-air and spray them with insecticides.

In an earlier report, Dr. Rainey and H. J. Sayer of the Survey, stated that application of this "aerial curtain" was responsible on one occasion for killing 3,000,000 locusts following the use of 300 gallons of spray on a single flying swarm.

Science News Letter, January 22, 1955

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ENTOMOLOGY

NATURE RAMBLINGS

Silverfish

➤ ONE OF the most bothersome of household insect pests, one that does not suspend operations even in the winter, is the silverfish, a bristle-tailed insect seldom seen and hard to catch when it is seen.

Its tapering body suggests a fish, and it is covered with glistening little scales, so the name is not inappropriate. Also it slips through the fingers that try to imprison it, like a wet fish.

Silverfish will turn up in the best-kept of houses, and indeed are especially likely to appear in homes that boast a library. For they are among the most troublesome of book pests. They will eat paper, being particularly fond of high quality papers with a glazed surface.

They may also eat the paste that holds the binding together, and if their nefarious work goes on long enough, it may require the rebinding of whole sets of volumes. By the same affinity for glue or paste, they are enemies of wall paper.

Besides ruining books and wall paper, the silverfish aims at the destruction of anything held together with paste or gum. It plays havoc with starched clothing, chews at the gum-glazed cardboard labels in museum cases, and gets into stored cereals and other starchy foods. It is fond of rayon and may cause serious damage to fabrics made of this fiber.

The silverfish multiplies most annoyingly. Like several other insects, it does not need a water supply to exist. The water needed for life is obtained by chemical processes within the body. The insect just manufactures it as required from its food material.

Silverfish are among the most primitive insects, according to the classification schemes of naturalists. Their body-structures are little specialized, their reactions are among the least complex known, and they have no wings. They have a number of relatives, including the so-called bristletails, and these all have the same shy and furtive habits.

Efforts to discourage these pests have been made by bookbinders who "dope" their paste with arsenic. More effective in controlling silverfish is DDT, used either as a spray or a dust. When this pest-killing chemical is applied thoroughly to the spots where the insects occur, death comes quickly, and a deposit of the chemical remains to kill those that later crawl over the treated surface. Pyrethrum sprays also kill the pests, but they act only upon direct contact with the silverfish and do not have a lasting effect.

It is rather in the nature of these seclusive pests to be in places not normally treated for their occurrence. Attics or basements, for instance, where books, magazines, papers and clothing are often accumulated make excellent hide-outs.

Representatives of the Department of Agriculture's Bureau of Entomology and Plant Quarantine vouch for the statement that one species, called the firebrat, is a veritable salamander, preferring to live in the vicinity of a fireplace, furnace or other hot spot. It crawls rapidly over hot bricks or metal and shows the most surprising immunity from the effects of high temperature.

Science News Letter, January 22, 1955

Questions

ENGINEERING—What materials in automobile exhausts react to make ozone? p. 55.

□ □ □

GENETICS—How thick are the fibrils that make up chromosomes according to the latest theory? p. 53.

□ □ □

GEOGRAPHY—Where is Timbuktu? p. 59.

□ □ □

RADIO ASTRONOMY—In what constellation is the center of the Milky Way? p. 51.

□ □ □

ZOOLOGY—Where is the largest herd of Texas longhorns? p. 61.

□ □ □

Photographs: Cover, Glen L. Martin Company; p. 51, Ohio State University; p. 53, Walter Reed Army Medical Center; p. 55, American Museum of Natural History; p. 64, Liesurehouse.

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The lens you see here is not glass but silver chloride, which is transparent all the way out beyond 17μ in the infrared. The speck it magnifies is typical of specks for which we run infrared absorption spectra in the course of solving our daily little problems. We use such lenses not as magnifiers but to constrict one of the beams in a double-beam infrared spectrophotometer so that all its flux can be put through a 0.75mm x 3.5mm aperture. This permits the use of a very small sample. Then a second such AgCl lens collimates the beam again.

The samples, frequently weighing 50 micrograms or less, are handled by grinding the material to be examined with a little potassium bromide and compressing to a narrow strip. Nothing is dissolved in the process, and there is less chance for reactions and extra absorption that might mask the few micrograms of organic material we seek to identify. KBr puts no dips of its own into the chart.

This procedure is much less expensive than working out reflecting microscope optics and hitching them to a spectrophotometer. We got into it in identifying spots on film that our testing department won't let us sell. It might interest others who have only very meagre samples to work with, like those who study blood and other life juices.

Since most infrared spectroscopists aren't as lucky as we in having a great optical factory in the immediate family, we thought it would be a friendly deed if we made up a stock of silver chloride lenses for anybody who wants to try out this wrinkle of ours.

The price is $102 for a set of Kodak Infrared Microsample Optics, *consisting of an unmounted pair of plano-convex AgCl lenses of 24mm diameter and 22mm focal length, coated with a black Ag_2S smoke that cuts out radiation below 1μ, plus a similar plane-parallel plate for the reference beam. The deal is with Eastman Kodak Company, Special Products Sales Division, Rochester 4, N. Y. We'll throw in a set of mounting drawings or give you the name of an infrared equipment manufacturer who supplies the whole assembly ready to slip into his spectrophotometer. We can also supply reprints of our papers on the method.*

Faster, faster

Where this man sits and writes pamphlets about photography 15 footcandles hit his face. That's just within the lower limit of illumination recommended for office work. Nobody, of course, snapshoots at that low a level. But good gracious, this picture was made with a $6.95 camera (our esteemed *Brownie Hawkeye*), unassisted by any additional light source, at its one and only setting of *f*/15, 1/40th of a second! Imagine what an adjustable camera would have done under the circumstances.

How in the world, etc.? The catch is that our Brownie was loaded with a new kind of film, *Kodak Tri-X Film*. Not really a catch, for you, too, can now buy it at any film counter. Such husbandry of photons! Currently available in No. 620, No. 120, No. 135-36 exposure rolls, and No. 523 film packs. No sacrifice of graininess. Exposure index nominally 200 but not too meaningful because latitude is of a type the definition-framers hadn't anticipated. This is quite an announcement.

We also have a companion announcement about color. A new 35mm color film with approximately *thrice* the speed of *Kodachrome Film* has just gone on the market. To process it to full-color transparencies calls for no major capital appropriation and no chemical engineering talent but merely for a *Kodak Ektachrome Processing Kit, Process E-2*, priced at $1.80. (It's really operable at the home darkroom level, but if you'd rather not bother, your Kodak dealer can handle it for you for processing by processors equipped to do the work.) This new film we identify as *Kodak Ektachrome 135 Film* (for 35mm miniature cameras, 20 exposures for $1.85) and *Kodak Ektachrome 828 Film* (for cameras like the *Kodak Pony* and *Bantam*, 8 exposures for $1). Photographic characteristics have been changed substantially from the sheet and roll film *Kodak Ektachrome* because the new film is intended to be viewed at large magnifications, as in projection, and the other isn't.

In sum:

1) The scope and even the style of black-and-white photography have been vastly extended by dispensing with the need for added light in many situations and in others permitting flash or flood lamp to bite far deeper into the gloom than ever before.

2) Color photography by 35mm camera can now be done in much less light than before, with results ready for inspection 65 minutes after the last shutter click.

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BAROMETER DIAL makes almost anyone an accurate weather forecaster. Sixteen specific weather conditions are included to give detailed predictions for the coming weather under both rising and falling barometer conditions.

Science News Letter, January 22, 1955

COATED PAPER produces positive prints in a few seconds from exposures made at one-half a second in outdoor light, with no chemical processing. Designed for getting rapid and permanent prints from photo negatives, microfilm enlargements or projected images, the new low-cost paper remains insensitive to light until the coating is given a negative electrostatic charge.

Science News Letter, January 22, 1955

SPY CAMERA is described as a replica of the one used by spies during World War II. Weighing less than ¾ of an ounce and smaller than a matchbox, the camera has a f4.5 lens and 1/30 second shutter speed. It takes eight pictures to a roll.

Science News Letter, January 22, 1955

LAUNDRY CART goes up and down stairs on sturdy wrought-iron skis, as shown in the photograph, without dumping clean or damp clothes. Two large rear wheels

and two front swivel-casters permit indoor and outdoor travel. The colorfast, washable denim basket features side pockets for soap, clothes-pins and bleaches. A "hang-it" device lets the housewife hang up freshly ironed clothes from her chair.

Science News Letter, January 22, 1955

ANTI-FREEZE TESTER gives the temperature of anti-freeze solutions instantaneously within two degrees of the correct freezing point. The thermometer reading in this pocket-size gauge is obtained from the actual freezing of a thimbleful of any anti-freeze with dry ice from a carbon dioxide fire extinguisher.

Science News Letter, January 22, 1955

BALL LEVEL is made of colored plastic and can be attached to a carpenter's level if the level glass breaks. The low point of the object being leveled is indicated by the position of the tiny steel ball as it comes to rest in the container.

Science News Letter, January 22, 1955

COMBINATION TOOL is a foolproof knife and tool sharpener. Just a few quick strokes against the built-in sharpening grooves and a razor edge is put on knives, axes, lawn-mowers, tools, skates, etc. The other end of the device has a glass-cutting wheel.

Science News Letter, January 22, 1955

PARTY TRAY grips firmly to a chair arm with two spring pressure clips holding it. Designed for handling snacks and drinks, this 8-inch-wide and 12-inch-long snack server is made of durable, washable and lightweight plastic. It can also be clipped to the thigh and used as a portable desk.

Science News Letter, January 22, 1955

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Do You Know?

The *woodcock* is the only bird in the Western Hemisphere whose upper bill is movable.

The flying fox, the largest of the *bats*, has a wingspread of five feet.

Fish seem to get their sleep in short naps during which they slumber quite soundly.

Ice-fog can seriously handicap airport operations in the Arctic.

The horned *frog* spends much of his life buried in mud with only his eyes above the surface to watch for prey.

Geese can fly at 60 miles an hour and they hold the bird altitude record of nearly five and a half miles.

More than half of United States *high school graduates* who are considered fully qualified for college work do not continue their higher education.